

REQUEST FOR RECONSIDERATION

Claims 1-6 and 8-12 remain active in this application.

The claimed invention is directed to a process for producing substituted benzoyl chlorides such as trimethylbenzoyl chloride (TMBC) by hydrolysis of a trichloromethylated compound in an aqueous organic phase from hydrolysis of an  $\text{AlCl}_3$  complex.

TMBC is an important raw material in the preparation of acylphosphine oxide type photoinitiators. Simple and economically viable methods for the preparation of substituted benzoyl chlorides are sought.

The claimed invention addresses this problem by providing a process for preparing substituted benzoyl chlorides by reacting substituted benzenes with  $\text{CCl}_4$  in the presence of  $\text{AlCl}_3$  to form the corresponding substituted trichloromethylated benzene with accompanying hydrolysis of a formed  $\text{AlCl}_3$  complex, followed by hydrolysis of the trichloromethylated benzene using **an aqueous organic phase** from the hydrolysis of the  $\text{AlCl}_3$  complex followed by distillation of water-free  $\text{CCl}_4$ . Applicants have discovered that addition of catalyst to the aqueous organic phase from hydrolysis of  $\text{AlCl}_3$  is sufficient to form substituted benzoyl chloride in high yield and to yield  $\text{CCl}_4$  of sufficient dry to be recycled to a Friedel-Crafts reaction without further drying. Such a process is nowhere disclosed or suggested in the cited references of record.

The rejection of claims 1-6 and 8-12 under 35 U.S.C. §103(a) over Hugo, U.S. 3,187,057 in view of Böckmann et al., U.S. 4,276,321 is respectfully traversed.

Neither reference discloses or suggests hydrolysis of a trichloromethylated benzene in an aqueous organic phase from the hydrolysis of  $\text{AlCl}_3$  complex. To the contrary, each of the cited references describes hydrolysis of a trichloromethylated benzene **in the absence of an organic solvent**.

As noted by the Examiner, Hugo et al. describes the formation of substituted trichloromethyl benzenes and further conversion to substituted benzoic acids by hydrolysis in the absence of an organic solvent. Example 1 produces a crude trichloromethyl benzene by removal of  $\text{CCl}_4$  prior to addition of aqueous sodium hydroxide in order to conduct hydrolysis to form substituted benzoic acids. The affirmative step of organic solvent removal is conducted prior to hydrolysis. Thus, Hugo et al. describes trichloromethyl benzene hydrolysis only after **removal of organic solvent**.

Böckmann et al. describes hydrolysis of substituted benzotrichloride with substituted benzoic acid and/or water (column 1, lines 28-42), but like Hugo et al. conducts such hydrolysis in the absence of an organic solvent. None of Examples 1-4 suggest inclusion of an organic phase, as claimed, during the hydrolysis process. To the contrary, the benzotrichloride is hydrolyzed by addition to catalyst and benzoic acid and/or water. No organic solvent is present during the hydrolysis process.

In contrast, the claimed invention is directed to a process for preparing substituted benzoyl chlorides by preparation of trichloromethylated substituted benzenes from substituted benzenes by reaction with  $\text{CCl}_4$  in the presence of  $\text{AlCl}_3$  followed by hydrolysis by addition of a catalyst using the aqueous **organic phase** from the hydrolysis of  $\text{AlCl}_3$ . Applicants note that the aqueous organic phase from the hydrolysis of  $\text{AlCl}_3$  will contain  $\text{CCl}_4$ . As the cited references fail to disclose or suggest hydrolysis of substituted trichloromethylated benzenes in an aqueous organic phase, as claimed, the claimed invention is clearly not rendered obvious by the cited references.

In asserting obviousness, the examiner asserts that 1) "it is common and desirable in the art not to perform purification after the first step" and that 2) there would be motivation to collect  $\text{CCl}_4$  for reuse (page 5 of official action).

Applicants respectfully submit that the assertions made by the examiner are contradicted by the references relied upon in the Official Action.

Specifically, Hugo in preparing substituted trichlorobenzoic acids, prior to hydrolysis of trichlorobenzenes, removes organic solvent. While the examiner has alluded to omission of a purification step as “common and desirable in the art” Hugo et al. demonstrates the necessity of removal of organic solvent prior to conducting hydrolysis to a benzoic acid. The demonstration of the necessity of removal of organic solvent prior to hydrolysis coupled with the general and common desire to omit such a step makes it not obvious to conduct hydrolysis in an organic solvent.

The examiner’s analysis of obviousness appears to focus on the expectation of hydrolysis **without purifying** the trichlorobenzene intermediate but does not assess the non-obviousness of conducting hydrolysis **in the presence of an organic solvent**.

As previously discussed, the aqueous organic phase from hydrolysis of the  $\text{AlCl}_3$  complex will principally contain  $\text{CCl}_4$ . The greater solubility of the trichlorobenzene intermediate in  $\text{CCl}_4$  over water is clear by the partitioning of the trichlorobenzene in the organic phase after hydrolysis of  $\text{AlCl}_3$ . Therefore, when conducting hydrolysis of trichlorobenzene in  $\text{CCl}_4$ , solubility issues of the aqueous reagent and catalyst are raised since  $\text{CCl}_4$  and water are clearly phase separable. Introduction of  $\text{CCl}_4$  into a trichlorobenzene hydrolysis acts to further separate the trichlorobenzene from the reagent water and catalyst, as such are phase separated from  $\text{CCl}_4$  and the trichlorobenzene. By providing a liquid phase in which the trichlorobenzene is more soluble, a reduction in the contact with the reagent water and catalyst is created. Each of Hugo et al. and Boeckmann have recognized the difficulties in conducting biphasic hydrolysis of trichlorobenzene and opted to concentrate the trichlorobenzene by removal of  $\text{CCl}_4$  prior to conducting any type of hydrolysis. Affirmative

steps taken by the cited references to remove  $\text{CCl}_4$  speaks volumes as to the lack of obviousness of conducting hydrolysis in the presence of  $\text{CCl}_4$ .

As the cited references fail to disclose or suggest a method in which substituted trichloromethylated benzenes are hydrolyzed using the aqueous **organic phase** from the hydrolysis of  $\text{AlCl}_3$  (e.g.  $\text{CCl}_4$ ) the claimed invention is clearly not obvious from the references and accordingly withdrawal of the rejection under 35 U.S.C. §103(a) is respectfully requested.

Applicants submit that this application is now in condition for allowance and early notification of such action is earnestly solicited.

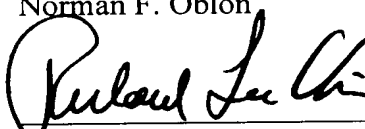
Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.  
Norman F. Oblon

Customer Number

22850

Tel: (703) 413-3000  
Fax: (703) 413 -2220  
(OSMMN 08/07)  
RLC/rac

  
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Richard L. Chinn, Ph.D.  
Registration No. 34,305